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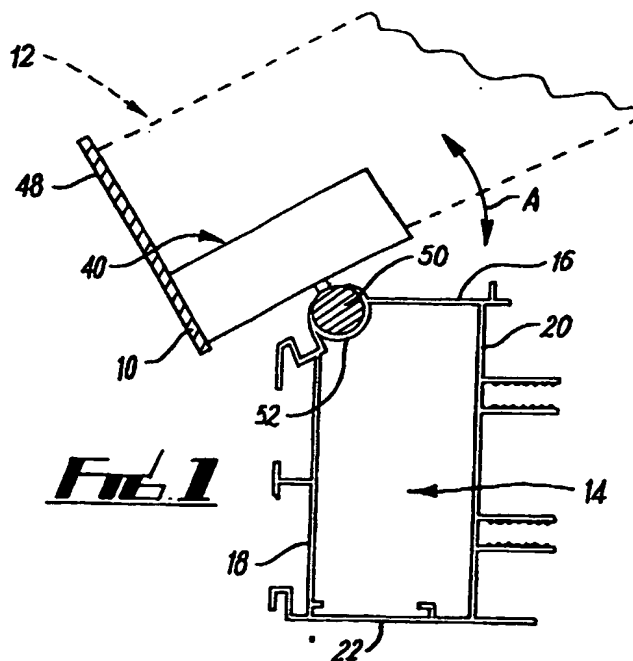
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(56) Documents Cited  
**GB 2347963 A** **GB 2335673 A**  
**GB 2259926 A** **GB 2212183 A**  
**DE 002752285 A** **US 4261143 A**

(58) Field of Search  
UK CL (Edition T ) E1R RRX RR24  
INT CL<sup>7</sup> E04B 7/02 7/04, E04D 3/06 3/08 3/14 3/36, E06B  
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(54) Abstract Title  
**Tilttable shoe for mounting a glazing bar**

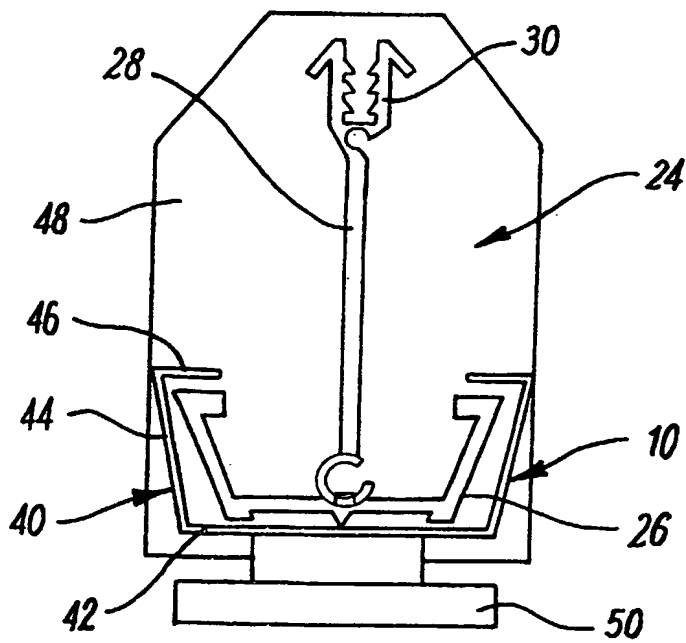
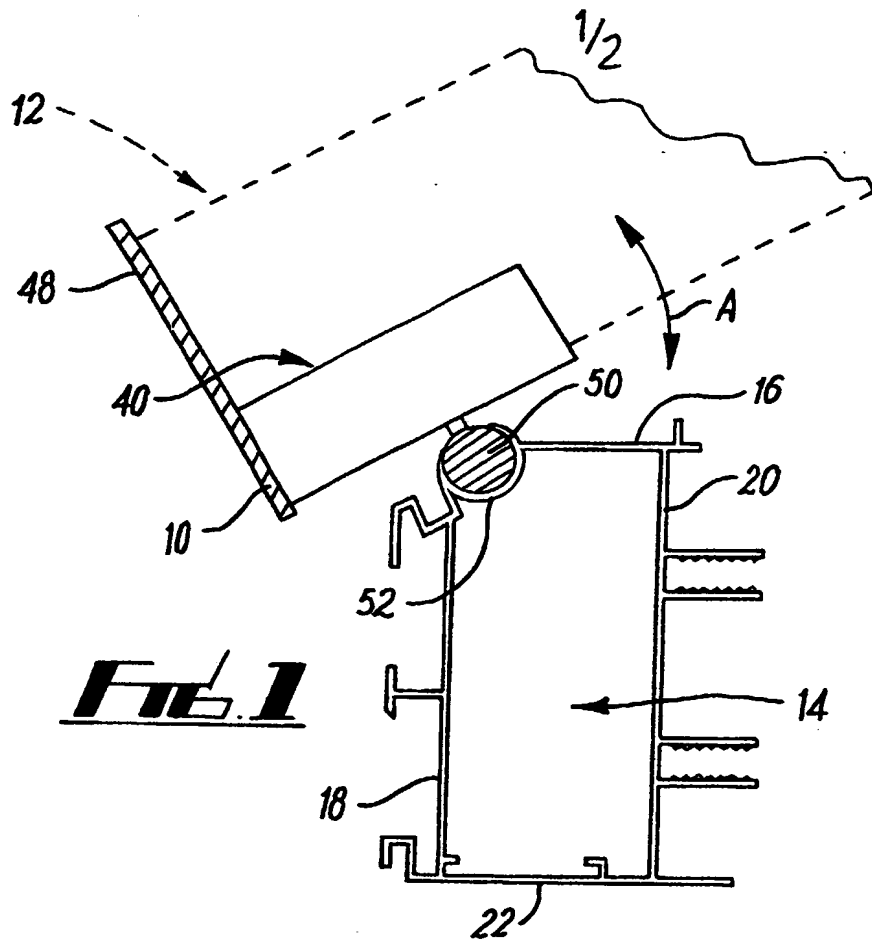
(57) A glazing bar mounting shoe 10 for connecting and locating one end of a glazing bar 12 is adapted to be tiltably mounted on an eaves structure 14. In the construction of a pitched roof an assembly comprising an eaves structure 14, glazing bars 12 and shoes 10 for coupling glazing bars 12 to an eaves structure 14 may be used. The shoe 10 may be of channel-section 40 and may slidably engage the bar 12. The shoe 10 may include an end stop 48 which limits the extent to which the glazing bar is insertable into the shoe 10. The glazing bar 12 may comprise an inner T-shaped member comprising a cross-piece and a central stem or may comprise an inner member and an attachable outer member in which the shoe 10 includes means for preventing separation of the inner and outer members. Means for fastening the glazing bar 12 to the shoe to prevent separation from the shoe 10 may be included. The shoe 10 may have a projection 50 for co-operation with a socket 52 associated with the eaves structure 14 to allow tilting of the shoe 10 and hence a glazing bar 12 coupled to the shoe 10. The projection 50 may be cup-shaped or cylindrical.



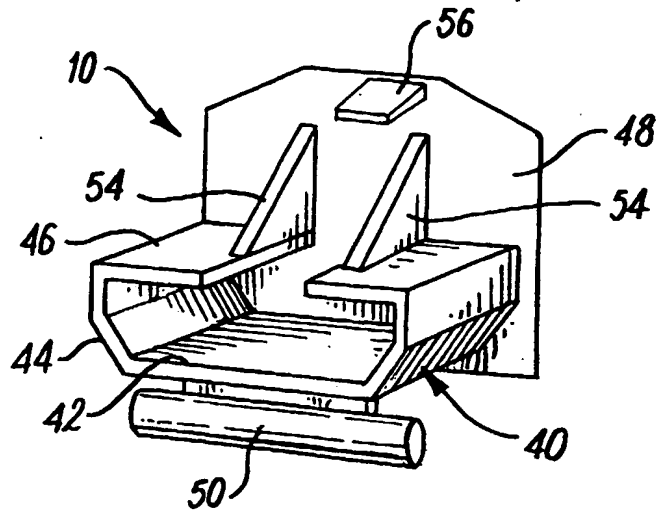
At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The print reflects an assignment of the application under the provisions of Section 30 of the Patents Act 1977.

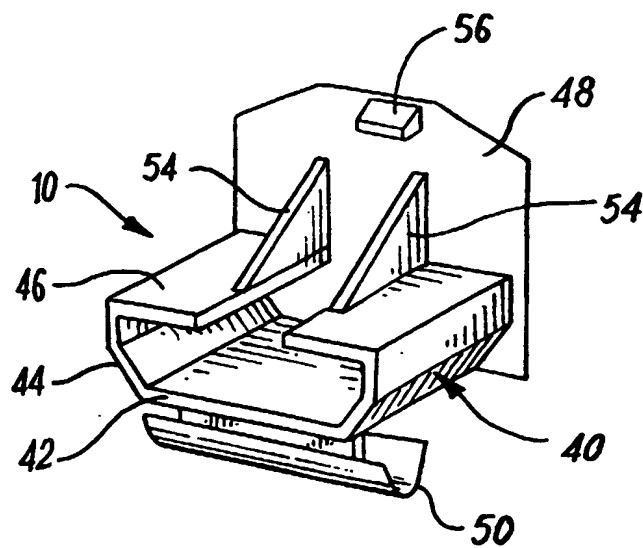
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**FIG. 3**



**FIG. 4**

### GLAZING BAR MOUNTINGS

This invention relates to the construction of roofs, especially conservatory  
5 roofs.

The invention is applicable for example to glazed roofs of the type comprising panels, e.g. of glass or a plastics material such as polycarbonate or polyvinyl chloride, supported between glazing bars which may be produced as extruded profiles. The  
10 glazing bars are coupled at one end to an eaves beam and extend upwardly to a fixing location at the opposite end, usually a ridge structure of the roof.

To allow for the pitch of the roof, it is known to connect the lower ends of the glazing bars to the eaves beams in such a way that they can be tilted to accommodate  
15 the desired roof pitch. In one known arrangement as disclosed in British Patent Application No. 2347963, the lower ends of the glazing bars are coupled to the eaves beam by a bolt having a head which is pivotally located in a channel forming part of the eaves beam.

The present invention seeks to provide an improved means for coupling the  
20 glazing bars to an eaves beam which affords greater flexibility during on-site installation.

According to one aspect of the present invention there is provided a glazing bar mounting shoe for interengaging with and locating one end of a glazing bar, the shoe being adapted to be tiltably mounted on an eaves structure.  
25

A feature of the invention is that the shoes may be used to locate the glazing bars without necessarily fastening them to the eaves structure, at least not during initial

assembly of the glazing bars to the eaves structure. This simplifies the installation procedure by making it less laborious and by saving time.

5 The shoe and the bar may slidably interengage one within the other, e.g. with the bar received within the shoe. The shoe and the bar may interengage as a close fit (e.g. an interference fit) so that the shoe and bar may remain interengaged without the aid of a fastening means. In this way, the initial stages of the installation do not require the glazing bars to be fastened to the eaves structure by bolts.

10 The shoe may include an end stop limiting insertion of the glazing bar and the end stop may also function as an end closure for the glazing bar.

Various other features and aspects of the invention will become apparent from the following description and the appended claims.

15 The invention will now be described by way of example only with reference to the accompanying drawings, in which:

20 Figure 1 is a diagrammatic side elevation showing a glazing bar mounting shoe assembled to an eaves beam;

Figure 2 is a diagrammatic end view of the shoe of Figure 1, also showing the profile of the inner member of the glazing bar; and

25 Figures 3 and 4 are diagrammatic perspective views of alternative forms of shoe.

The glazing bar mounting shoes 10 of the present invention are typically used in the construction of a glazed conservatory roof comprising glazing bars 12 extending between a ridge structure and an eaves structure including at least one eaves beam 14. Glazing roofing panels are supported by the glazing bars 12 and are typically in the form of polycarbonate, polyvinyl chloride or glass, each panel being supported at its edges by the glazing bars. The eaves beam is typically an extrusion of aluminium or aluminium alloy and is mounted on top of window frames forming the sides of the conservatory. As shown, the eaves beam 14 is of box-section having a top wall 16, front wall 18, rear wall 20 and bottom wall 22.

The glazing bars 12 may comprise an inner member 24 and an outer member (not shown) attachable to the inner member. The glazing bar construction may be of any of the forms disclosed in our prior British Patent Applications filed on 1 August 2001 under references N01/0455/GB and N01/0471/GB, the entire disclosures of which are incorporated herein by this reference.

The inner member 24 is T-shaped and comprises a cross-piece 26 and a central stem 28 which terminates at its upper end in a channel 30 by means of which the outer member may be attached to the inner member, e.g. in the manner disclosed in the above mentioned prior British Applications. The cross-piece 26 may be provided with cladding (not shown) to conceal the inner member on the inner side of the roof. Once the outer members have been assembled to the inner members of the glazing bars, the roofing panels are trapped between the inner and outer members in the manner disclosed in the prior British Applications.

In constructing the roof, the glazing bars are coupled at their lower ends to the eaves structure in a tiltable manner to accommodate the pitch of the roof. British Patent

Application No. 2332687 illustrates one form of coupling technique in which the lower ends of the glazing bars are coupled to the eaves beam by means of bolts, the heads of which are pivotably located in a channel of the eaves beam to allow variation of the angle. This gives rise to difficulties during installation since the installer has to manipulate the glazing bars to register them both with the ridge structure and with the tiltable bolts and also fasten the bolts to the glazing bars.

The present invention simplifies the installation procedure by provision of the glazing bar mounting shoes 10 which are designed to be mounted tiltably on the eaves structure and engage with the glazing bars in such a way that one component inserts or nests within the other in telescopic fashion and locates the glazing bars relative to the eaves structure without requiring any fastening, at least not initially. In this manner, instead of having to fasten the glazing bars while holding them up in the air, after the shoes have been initially engaged with the eaves structure, the installer can then engage sufficient glazing bars with respective shoes to support the ridge structure without having to effect permanent securement of the glazing bars to the eaves structure at that stage.

As shown in Figure 2, each shoe may comprise a channel-section 40 having a base 42, sides walls 44 and inwardly projecting flanges 46 bounding the mouth of the channel. One end of the channel is closed by stop plate 48 and the opposite end is open. The lower end portion of the glazing bar (of which only the inner member 24 is illustrated) inserts slidably into the channel 40 with the cross-piece 26 received as a close fit within the channel and with the stem 28 of the T projecting through the open mouth of the channel. The flanges 46 serve to trap the cross-piece 26 within the shoe. The fit may be sufficiently close (e.g. an interference fit) that adequate resistance to withdrawal of the glazing bar is provided to prevent the glazing bar accidentally falling out of the shoe once inserted. Initially only the inner member 24 of the glazing bar is engaged with the shoe. The outer member is assembled after the roofing panels have been put in place.

The base of the channel 40 acts as cladding for the lower end portion of the inner member 24, the remaining length being clad by for example plastics cladding extending along the inner face of the glazing bar substantially from the shoe to the ridge. The stop plate 48 as well as limiting the extent to which the glazing bar can be inserted, also serves as an end closure for the glazing bar thereby obviating the need for a separate end closure. If desired, the stop plate 48 may be provided with a projection (not shown) for co-operation with the outer member to prevent the latter being lifted at that point by a would-be intruder attempting to gain access through the roof by removing the roofing panels.

At its underside, the shoe 10 is provided with a downwardly directed projection which terminates in a portion 50 which co-operates with the eaves beam to allow the shoe and hence the glazing bar to tilt in the direction depicted by reference A according to the desired pitch of the roof. For this purpose, the profile of the eaves beam includes a channel 52 for reception of the portion 50 so as to allow such tilting to occur. In the embodiment of Figure 2, the portion 50 may be generally cylindrical or spherical (at least in part) and the channel 52 is of generally complementary curvature. The portion 50 may be insertable through the open mouth of the channel 52 in which case the portion 50 may be resiliently deformable to allow this. Alternatively the portion 50 may be inserted from one open end of the channel 52. In both instances, the interengagement between the portion 50 and the channel is such that the shoe may slide lengthwise of the eaves beam to enable it to be positioned in any desired location.

Figures 3 and 4 illustrate modified forms of the shoe in both of which the channel-section 40 of slightly different configuration to that of Figures 1 and 2 but is again designed for reception of the glazing bar by sliding insertion as a close fit. Also both of these embodiments include strengthening or bracing plates 54 securing the upper part of the stop plate 48 to the shoe and a projection 56 for co-operation with the outer member



of the glazing bar to prevent it being lifted away from the inner member in the vicinity of the shoe. For instance, the projection 56 may be arranged to overlie the outer member for this purpose.

5           The bracing plates may in addition to affording reinforcement for the end stop 48 also serve to locate fastening means for securing the shoe to the glazing bar. For example, the bracing plates 54 and the central stem 28 of the inner member 24 may be drilled to receive a bolt to couple the stem to the bracing plates.

10           In Figure 3, the shoe is provided with a tilting portion 50 of generally cylindrical configuration whereas in Figure 4, it is provided with tilting portion 50 in the form of a curved cup-shaped section which is downwardly convex for co-operation with the channel 52 of the eaves beam.

15           In each of the illustrated embodiments, the shoe may comprise a plastics moulding, e.g. a single piece moulding, of suitable material such as polypropylene or nylon. Alternatively, it may be fabricated from other materials such as aluminium or other metal.

20           The shoes disclosed herein may also be used in conjunction with an eaves structure of the form disclosed in our co-pending GB Patent Application of even date herewith and filed under reference number N01/0480/GB, the entire disclosure of which is incorporated herein by this reference.

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## CLAIMS

1. A glazing bar mounting shoe for interengaging with and locating one end of a glazing bar, the shoe being adapted to be tiltably mounted on an eaves structure.  
5
2. An assembly for use in the construction of a pitched roof, comprising at least one eaves structure, at least one glazing bar and at least one shoe as claimed in Claim 1 for coupling the glazing bar(s) to the eaves structure(s).
- 10 3. A bar or assembly as claimed in Claim 1 or 2 in which the shoe and the bar slidably interengage one within the other.
4. A bar or assembly as claimed in Claim 3 in which the bar is received within the shoe.  
15
5. A bar or assembly as claimed in Claim 3 or 4 in which the shoe and the bar interengage as a close fit (e.g. an interference fit) so that the shoe and bar may remain interengaged without the aid of a fastening means.
- 20 6. A bar or an assembly as claimed in any one of the preceding claims in which the glazing bar is insertable endwise into the shoe.
7. A bar or assembly as claimed in Claim 6 in which the shoe includes an end stop which limits the extent to which the bar is insertable into the shoe.  
25
8. A bar or assembly as claimed in any one of the preceding claims in which the shoe is of channel-section.

9. A bar or assembly as claimed in Claim 8 in which the shoe is of channel-section and in which the bar is insertable into the shoe through one end of the channel.

10. A bar or assembly as claimed in any one of the preceding claims in which the  
5 glazing bar comprises an inner T-shaped member comprising a cross-piece and a central stem.

11. A bar or assembly as claimed in Claim 10 when dependent on Claim 9 in  
10 which the inner member is insertable endwise into the channel-section shoe in such a way that the cross-piece is trapped within the channel and the stem of the T projects through an open mouth of the channel.

12. A bar or assembly as claimed in Claim 9 in which the cross-piece is trapped  
15 in the channel by a flange or flanges bounding the mouth of the channel.

13. A bar or assembly as claimed in any one of the preceding claims in which the  
glazing bar comprises an inner member and an outer member attachable to the inner  
member and in which the shoe includes means for preventing separation of the outer  
member from the inner member at the lower end thereof when the glazing bar is engaged  
20 with the shoe in the normal position of use.

14. A bar or assembly as claimed in Claim 13 in which the separation-preventing  
means comprises an projection co-operating with the outer member when the glazing bar  
is engaged with the shoe.

15. A bar or assembly as claimed in any Claim 10 or 11 including means for use  
25 in fastening the glazing bar to the shoe to prevent separation of the bar from the shoe.

16. A bar or assembly as claimed in Claim 15 in which such means is external to the channel.

5 17. A bar or assembly as claimed in Claim 10, 11 or 16 in which the channel is provided with an end plate to limit insertion of the bar and in which bracing plates are provided for use in connection of the end plate to the channel.

10 18. A bar or assembly as claimed in Claim 17 when dependent on Claim 16 in which the bracing plates form the means for use in fastening the bar to the shoe.

15 19. A bar or assembly as claimed in any one of the preceding claims in which the shoe includes a projection for co-operation with a socket associated with the eaves structure to allow tilting of the shoe and hence a glazing bar coupled to the shoe.

20. A bar or assembly as claimed in Claim 19 in which the projection includes a portion having a curvilinear outer surface for co-operation with the socket.

20 21. A bar or assembly as claimed in Claim 20 in which the curvilinear portion of the projection is generally cup-shaped.

22. A bar or assembly as claimed in Claim 19 in which the projection includes a generally cylindrical or generally part-cylindrical portion for engagement within the socket.

25 23. A roofing structure assembled using at least one shoe or an assembly according to any one of the preceding claims.

24. A glazing bar mounting shoe substantially as hereinbefore described with reference to, and as shown in, any one of the embodiments illustrated in the accompanying drawings.

Amendments to the claims have been filed as follows

1. A glazing bar mounting shoe for interengaging with and locating one end of  
5 a glazing bar, the shoe being adapted to be tiltably mounted on an eaves structure and the  
arrangement being such that the glazing bar is insertable endwise into the shoe, the shoe  
including an end stop which limits the extent to which the bar is insertable into the shoe.

2. An assembly for use in the construction of a pitched roof, comprising at least  
10 one eaves structure, at least one glazing bar and at least one shoe as claimed in Claim 1 for  
coupling the glazing bar(s) to the eaves structure(s).

3. A shoe or assembly as claimed in Claim 1 or 2 in which the shoe and the bar  
15 slidably interengage one within the other.

4. A shoe or assembly as claimed in Claim 3 in which the bar is received within  
the shoe.

5. A shoe or assembly as claimed in Claim 3 or 4 in which the shoe and the bar  
20 interengage as a close fit (e.g. an interference fit) so that the shoe and bar may remain  
interengaged without the aid of a fastening means.

6. A shoe or assembly as claimed in any one of the preceding claims in which  
the shoe is of channel-section.  
25

7. A shoe or assembly as claimed in Claim 6 in which the shoe is of channel-  
section and in which the bar is insertable into the shoe through one end of the channel.

8. A shoe or assembly as claimed in any one of the preceding claims in which the glazing bar comprises an inner T-shaped member comprising a cross-piece and a central stem.

5 9. A shoe or assembly as claimed in Claim 8 when dependent on Claim 7 in which the inner member is insertable endwise into the channel-section shoe in such a way that the cross-piece is trapped within the channel and the stem of the T projects through an open mouth of the channel.

10 10. A shoe or assembly as claimed in Claim 7 in which the cross-piece is trapped in the channel by a flange or flanges bounding the mouth of the channel.

11. A shoe or assembly as claimed in any one of the preceding claims in which the glazing bar comprises an inner member and an outer member attachable to the inner  
15 member and in which the shoe includes means for preventing separation of the outer member from the inner member at the lower end thereof when the glazing bar is engaged with the shoe in the normal position of use.

12. A shoe or assembly as claimed in Claim 11 in which the separation-  
20 preventing means comprises an projection co-operating with the outer member when the glazing bar is engaged with the shoe.

13. A shoe or assembly as claimed in any Claim 9 or 10 including means for use in fastening the glazing bar to the shoe to prevent separation of the bar from the shoe.

25 14. A shoe or assembly as claimed in Claim 13 in which such means is external to the channel.

15. A shoe or assembly as claimed in Claim 8, 9 or 14 in which the channel is provided with an end plate to limit insertion of the bar and in which bracing plates are provided for use in connection of the end plate to the channel.

5 16. A shoe or assembly as claimed in Claim 15 when dependent on Claim 14 in which the bracing plates form the means for use in fastening the bar to the shoe.

17. A shoe or assembly as claimed in any one of the preceding claims in which the shoe includes a projection for co-operation with a socket associated with the eaves  
10 structure to allow tilting of the shoe and hence a glazing bar coupled to the shoe.

18. A shoe or assembly as claimed in Claim 17 in which the projection includes a portion having a curvilinear outer surface for co-operation with the socket.

15 19. A shoe or assembly as claimed in Claim 18 in which the curvilinear portion of the projection is generally cup-shaped.

20. A shoe or assembly as claimed in Claim 17 in which the projection includes a generally cylindrical or generally part-cylindrical portion for engagement within the  
20 socket.

21. A roofing structure assembled using at least one shoe or an assembly according to any one of the preceding claims.

25 22. A glazing bar mounting shoe substantially as hereinbefore described with reference to, and as shown in, any one of the embodiments illustrated in the accompanying drawings.





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Application No: GB 0119048.7  
Claims searched: 1-23

Examiner: Ben Widdows  
Date of search: 7 March 2002

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.T): E1R RRX

Int Cl (Ed.7): E04B 7/02 7/04  
E04D 3/06 3/08 3/14 3/36  
E06B 3/68

Other: Online: WPI, EPODOC, JAPIO

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
Y	GB 2347963 A (ULTRAFRAME) see fig 1	13&14
X	GB 2335673 A (CDW PRODUCTS LTD) see fig 1	1,2,7,19, 20,22&23
X,Y	GB 2259926 A (SCHOLES) see fig 4	X:1-6,8,9, 10,11,12, 19,20, 21&23 Y:13&14
X,Y	GB 2212183 A (UNIVERSAL COMPONENTS LTD) see fig 2	X:1-6, 8-12,19, 20,21,&23 Y:13&14
X	US 4261143 A (RIZZO) see fig 1	1,3,4,6-9, 15-17, 19,20&23
X,Y	DE 2752285 A (LOHMANN) see fig 1	X:1-4,6-9, 15,17,19, 20,22&23 Y:13&14

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.



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**Application No:** GB 0119048.7  
**Claims searched:** 1-23

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**Examiner:** Ben Widdows  
**Date of search:** 7 March 2002

Category	Identity of document and relevant passage	Relevant to claims

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.